

IRF740
IRF740FI

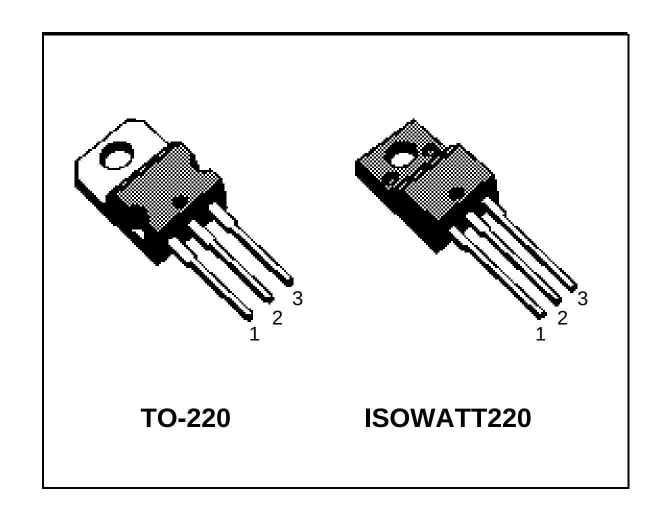
N - CHANNEL ENHANCEMENT MODE POWER MOS TRANSISTORS

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
IRF740	400 V	< 0.55 Ω	10 A
IRF740FI	400 V	< 0.55 Ω	5.5 A

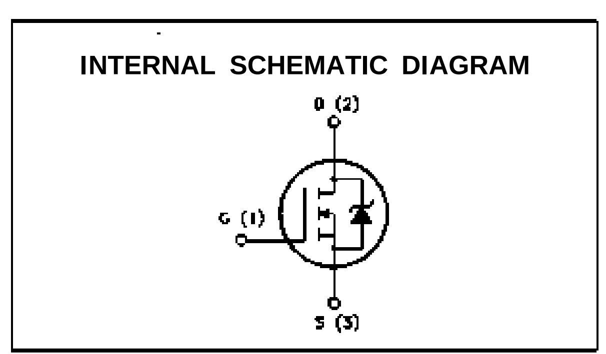
- TYPICAL $R_{DS(on)}$ = 0.42 Ω
- AVALANCHE RUGGED TECHNOLOGY
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100^{o}C

APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- SWITCH MODE POWER SUPPLIES (SMPS)
- CHOPPER REGULATORS, CONVERTERS, MOTOR CONTROL, LIGHTING FOR INDUSTRIAL AND CONSUMER ENVIRONMENT



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		IRF740	IRF740FI	
V_{DS}	Drain-source Voltage (V_{GS} = 0)	400	400	V
V_{DGR}	Drain- gate Voltage (R_{GS} = 20 kΩ)	400	400	V
V_{GS}	Gate-source Voltage	± 20		V
I_D	Drain Current (cont.) at T_c = 25 ^{o}C	10	5.5	A
I_D	Drain Current (cont.) at T_c = 100 ^{o}C	6.3	3	A
I_{DM}(•)	Drain Current (pulsed)	40	40	A
P_{tot}	Total Dissipation at T_c = 25 ^{o}C	125	40	W
	Derating Factor	1	0.32	W/^{o}C
V_{ISO}	Insulation Withstand Voltage (DC)	—	2000	V
T_{stg}	Storage Temperature	-65 to 150		^{o}C
T_j	Max. Operating Junction Temperature	150		^{o}C

(•) Pulse width limited by safe operating area

THERMAL DATA

		TO-220	ISOWATT220	
$R_{thj-case}$	Thermal Resistance Junction-case Max	1	3.12	$^oC/W$
$R_{thj-amb}$	Thermal Resistance Junction-ambient Max	62.5		$^oC/W$
R_{thc-s}	Thermal Resistance Case-sink Typ	0.5		$^oC/W$
T_l	Maximum Lead Temperature For Soldering Purpose	300		^oC

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max, $\delta < 1\%$)	10	A
E_{AS}	Single Pulse Avalanche Energy (starting $T_j = 25\ ^oC$, $I_D = I_{AR}$, $V_{DD} = 25$ V)	520	mJ
E_{AR}	Repetitive Avalanche Energy (pulse width limited by T_j max, $\delta < 1\%$)	13	mJ
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive ($T_c = 100\ ^oC$, pulse width limited by T_j max, $\delta < 1\%$)	5.8	A

ELECTRICAL CHARACTERISTICS ($T_{case} = 25\ ^oC$ unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 250\ \mu A$ $V_{GS} = 0$	400			V
I_{DSS}	Zero Gate Voltage Drain Current ($V_{GS} = 0$)	V_{DS} = Max Rating V_{DS} = Max Rating x 0.8 $T_c = 125\ ^oC$			250 1000	μA μA
I_{GSS}	Gate-body Leakage Current ($V_{DS} = 0$)	$V_{GS} = \pm 20$ V			± 100	nA

ON (∗)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250\ \mu A$	2	3	4	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10V$ $I_D = 5$ A		0.42	0.55	Ω
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $V_{GS} = 10$ V	10			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (∗)	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 5$ A	4	6		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	$V_{DS} = 25$ V f = 1 MHz $V_{GS} = 0$		1150 220 100	1450 260 120	pF pF pF



ELECTRICAL CHARACTERISTICS (continued)

SWITCHING RESISTIVE LOAD

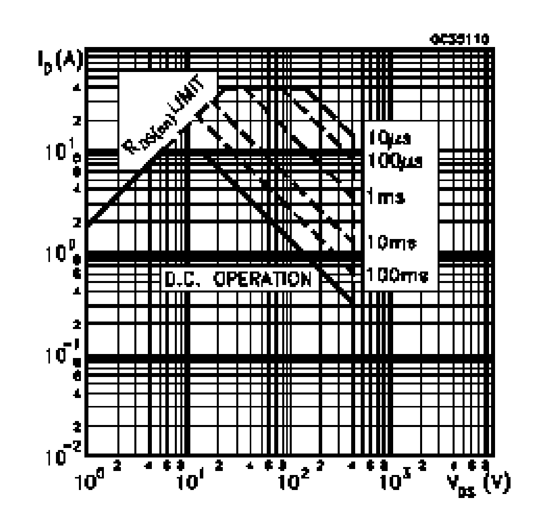
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Time	V_{DD} = 175 V I_D = 5 A		25	32	ns
t_r	Rise Time	R_i = 4.7 Ω		37	48	ns
$t_{d(off)}$	Turn-off Delay Time	(see test circuit)		120	155	ns
t_f	Fall Time			30	38	ns
Q_g	Total Gate Charge	I_D = 10 A V_{GS} = 10 V		72	90	nC
Q_{gs}	Gate-Source Charge	V_{DD} = Max Rating x 0.8		10		nC
Q_{gd}	Gate-Drain Charge	(see test circuit)		40		nC

SOURCE DRAIN DIODE

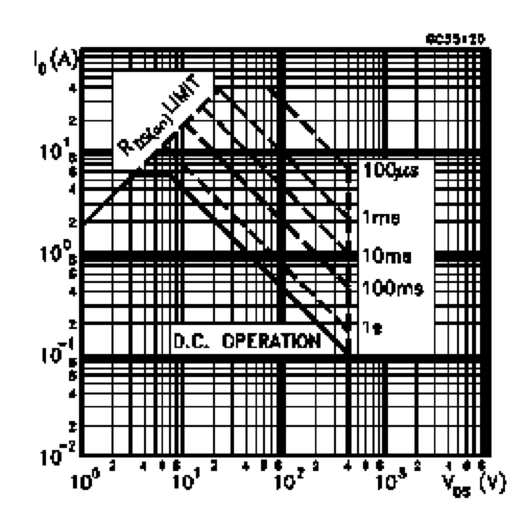
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				10	A
I_{SDM}(•)	Source-drain Current (pulsed)				40	A
V_{SD} (∗)	Forward On Voltage	I_{SD} = 10 A V_{GS} = 0			2	V
t_{rr}	Reverse Recovery Time	I_{SD} = 10 A di/dt = 100 A/μs V_{DD} = 100 V T_j = 150 °C		530		ns
Q_{rr}	Reverse Recovery Charge			7.7		μC

(∗) Pulsed: Pulse duration = 300 μs, duty cycle 1.5 %
(•) Pulse width limited by safe operating area

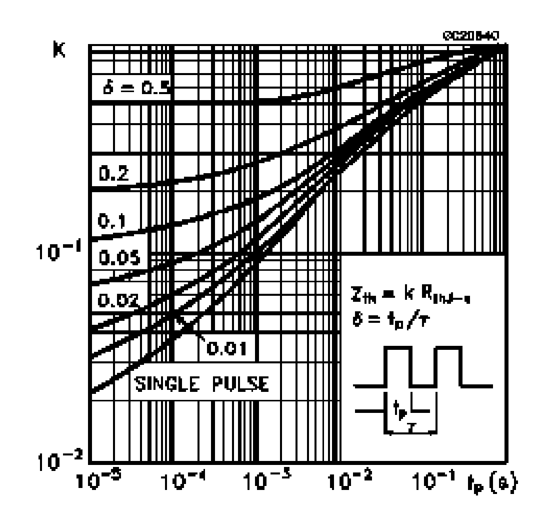
Safe Operating Area for TO-220



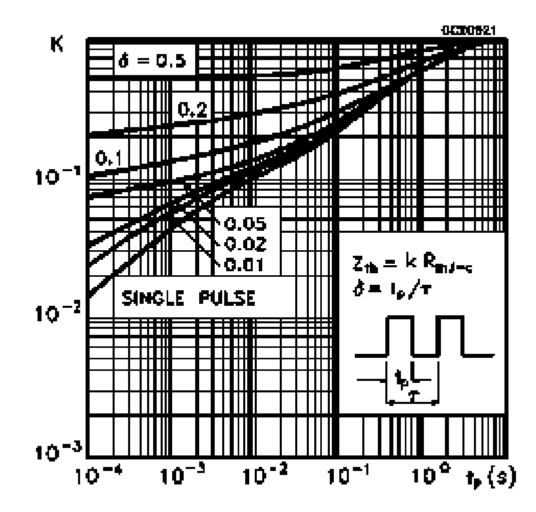
Safe Operating Area for ISOWATT220



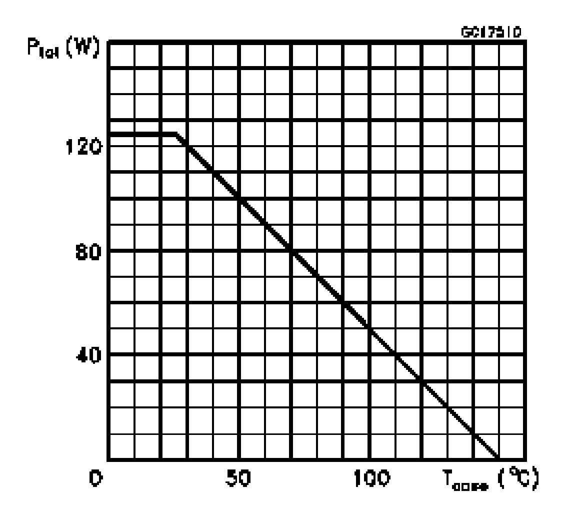
Thermal Impedance for TO-220



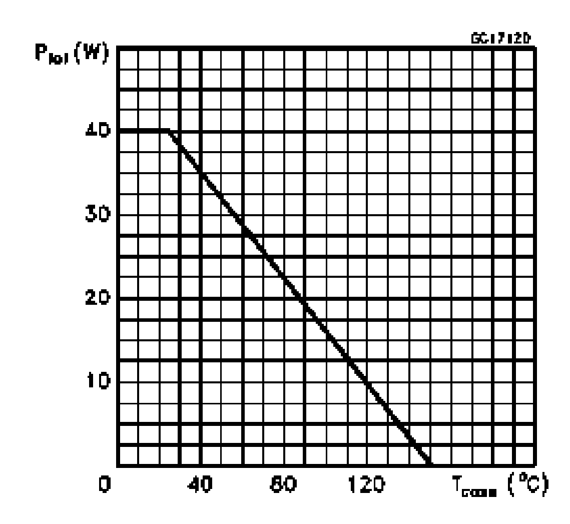
Thermal Impedance for ISOWATT220



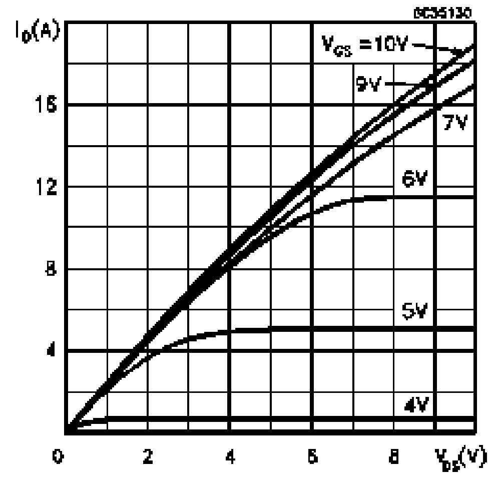
Derating Curve for TO-220



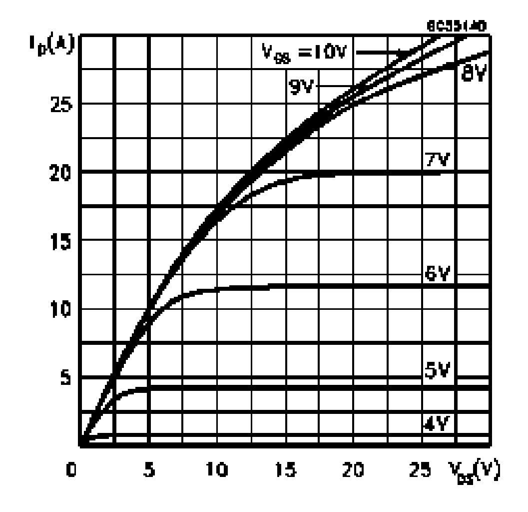
Derating Curve for ISOWATT220



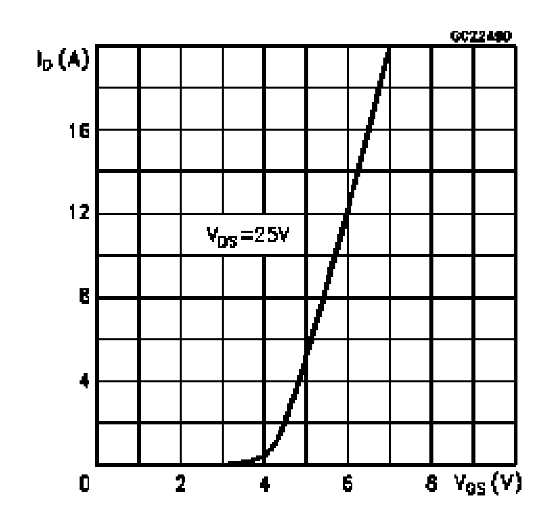
Output Characteristics



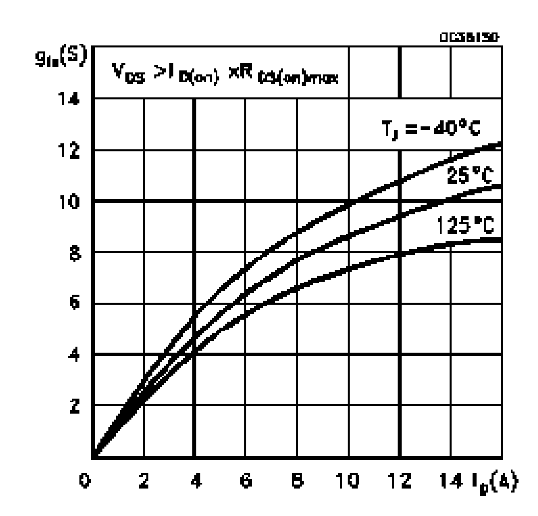
Output Characteristics



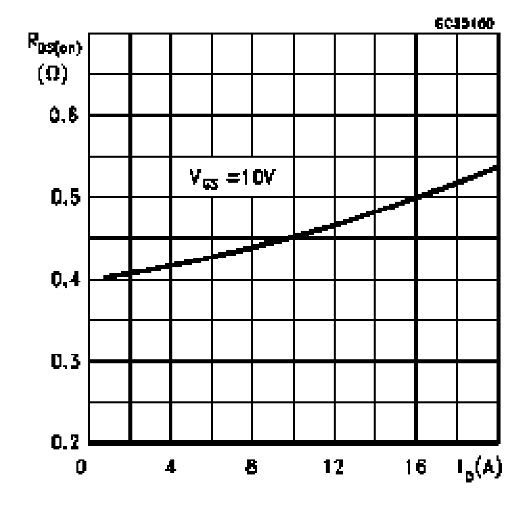
Transfer Characteristics



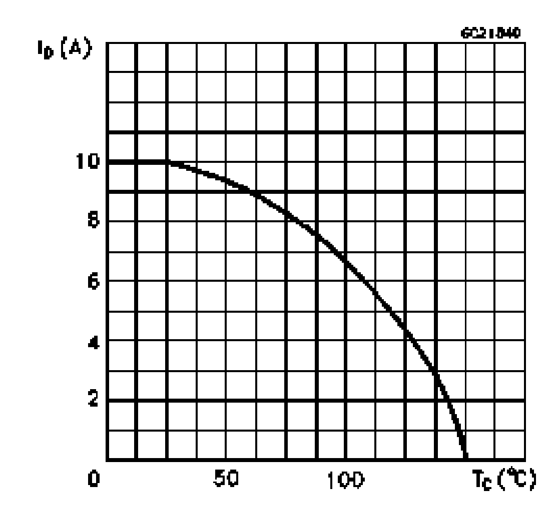
Transconductance



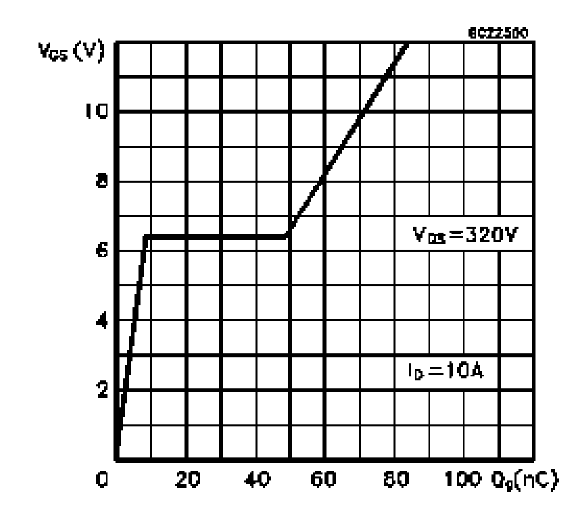
Static Drain-source On Resistance



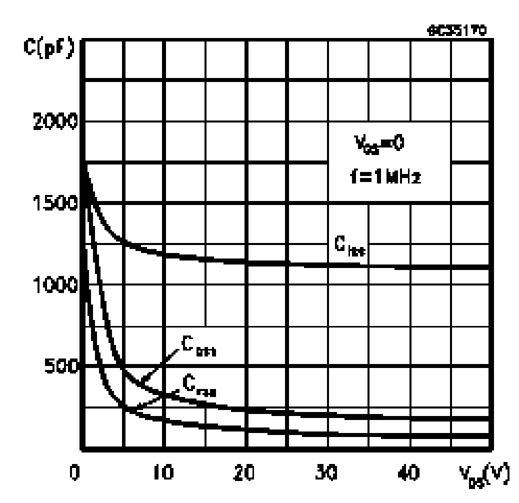
Maximum Drain Current vs Temperature



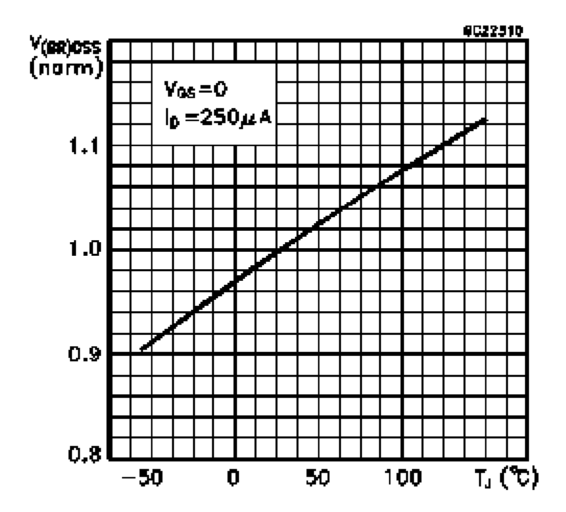
Gate Charge vs Gate-source Voltage



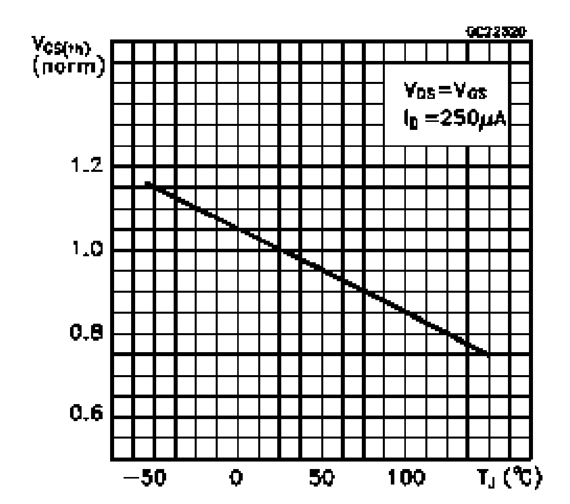
Capacitance Variations



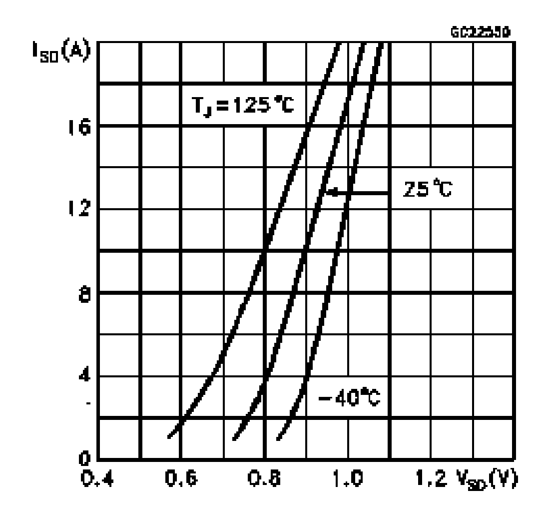
Normalized Breakdown Voltage vs Temperature



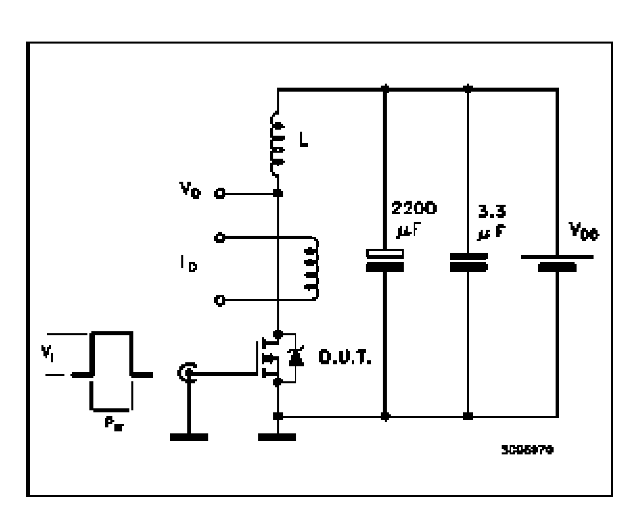
Normalized On Resistance vs Temperature



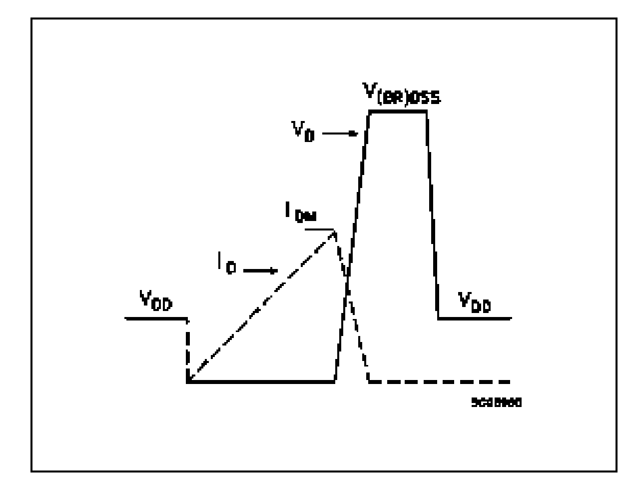
Source-drain Diode Forward Characteristics



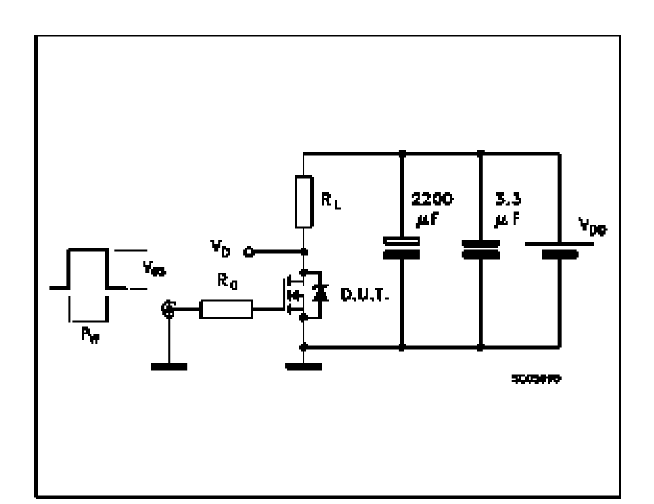
Unclamped Inductive Load Test Circuit



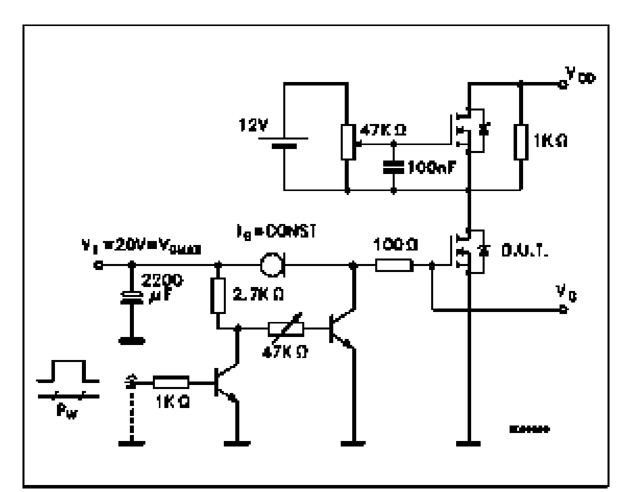
Unclamped Inductive Waveforms



Switching Time Test Circuit

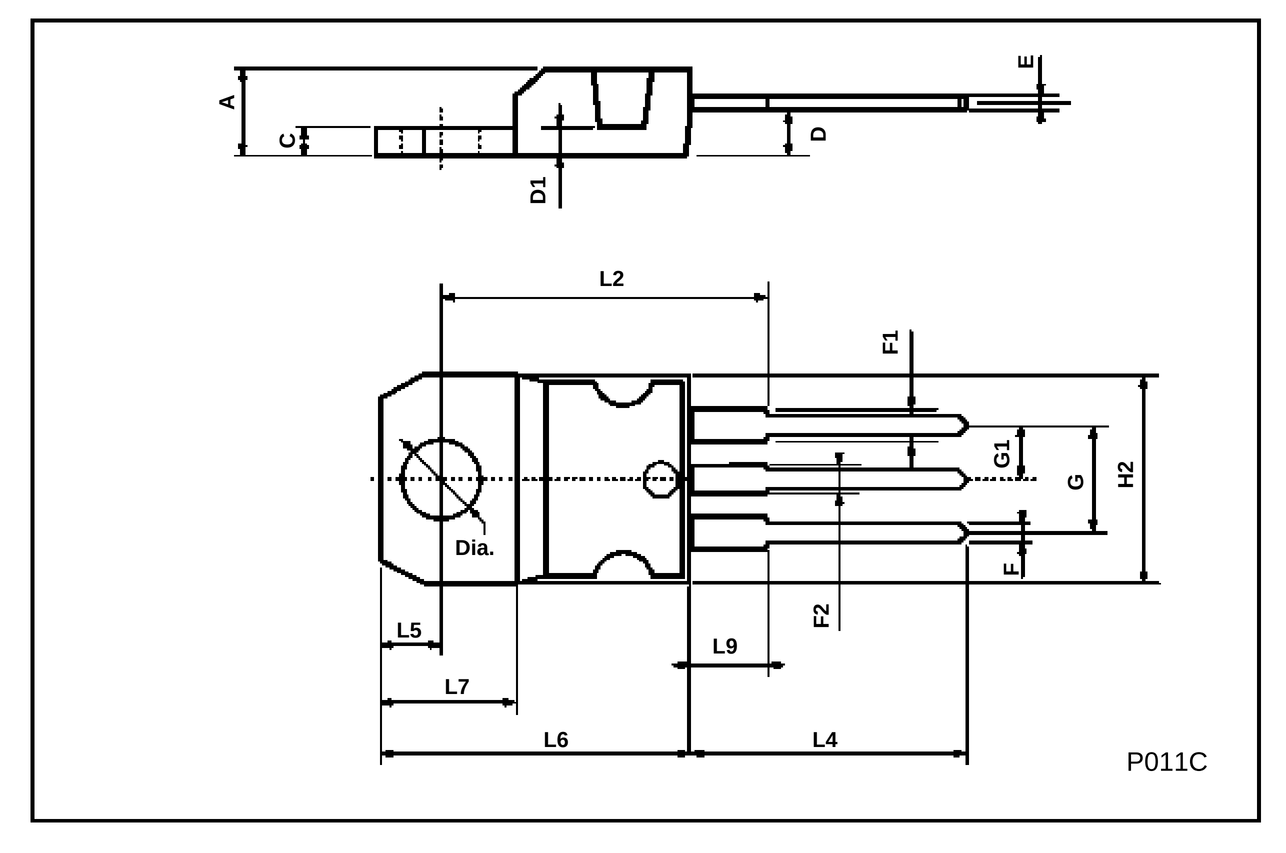


Gate Charge Test Circuit



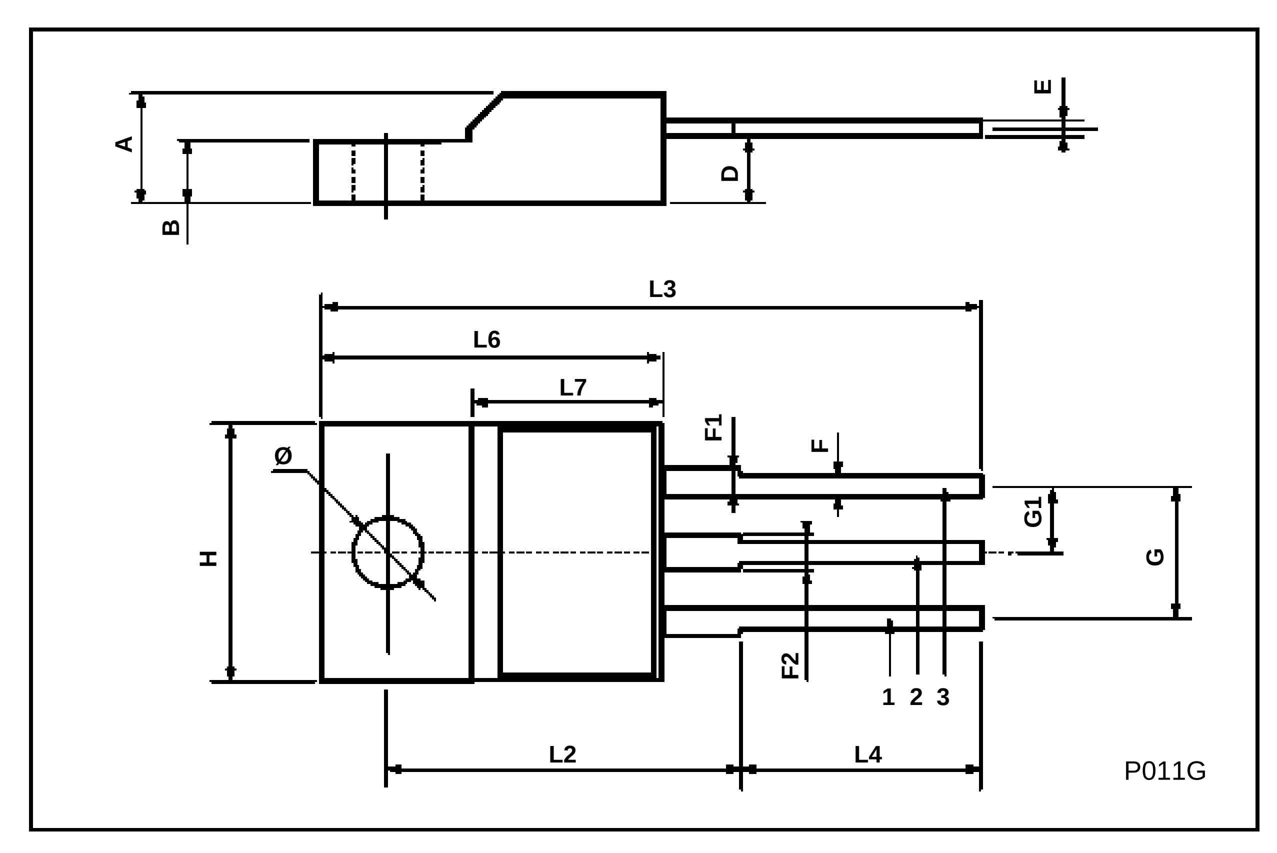
TO-220 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



ISOWATT220 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.4		4.6	0.173		0.181
B	2.5		2.7	0.098		0.106
D	2.5		2.75	0.098		0.108
E	0.4		0.7	0.015		0.027
F	0.75		1	0.030		0.039
F1	1.15		1.7	0.045		0.067
F2	1.15		1.7	0.045		0.067
G	4.95		5.2	0.195		0.204
G1	2.4		2.7	0.094		0.106
H	10		10.4	0.393		0.409
L2		16			0.630	
L3	28.6		30.6	1.126		1.204
L4	9.8		10.6	0.385		0.417
L6	15.9		16.4	0.626		0.645
L7	9		9.3	0.354		0.366
Ø	3		3.2	0.118		0.126




SGS-THOMSON
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